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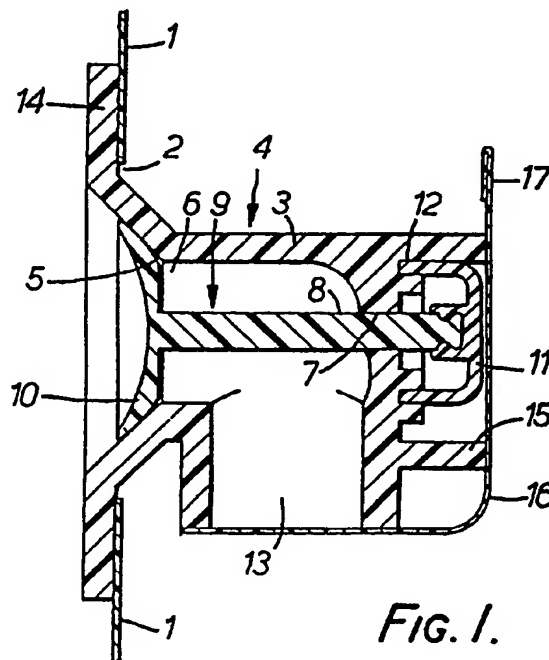
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## (54) Bag and valve combination

(57) A valve device 4 of a thermoplastics bag-in-box, wine-containing pack comprises a one-piece thermoplastics housing 3 including, at its inner end, a flange 14 attached to the inside of an aperture 2 in the bag 1 by fusion or adhesion, eg. by heat welding. A one-piece valve member 9 includes a closure element 10 urged against the valve seat 5 by a manually depressable biasing diaphragm 11 and the wine in the bag 1. An outlet mouth 13 of the device 4 and the mouth of an annular flange 15 protecting the diaphragm 11 are each sealed by a sealing strip 16.



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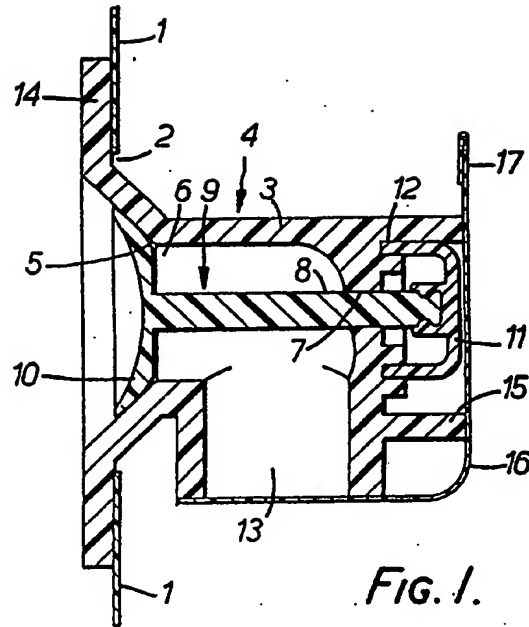


FIG. 1.

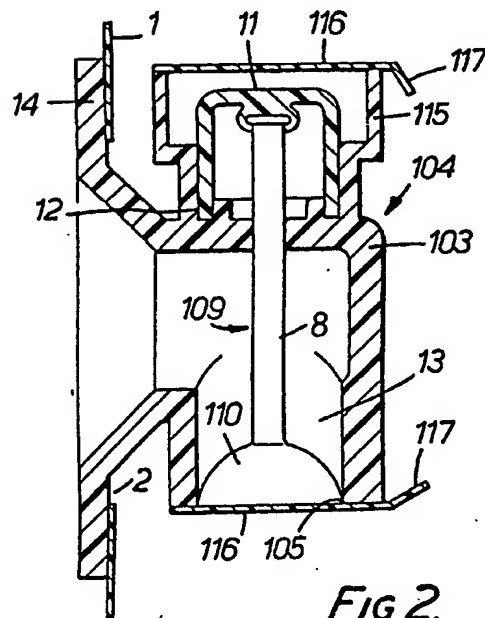


FIG. 2.

## SPECIFICATION

## A valve device

5 According to a first aspect of the present invention, there is provided a valve device including a first sealing zone at which two parts of said valve device are in sealing contact with each other, and a second sealing zone  
10 which is arranged in series with said first sealing zone with respect to the flow of any fluid leaking through between said two parts and at which a fusion or adhesion seal is provided.

According to a second aspect of the present invention, there is provided a combination comprising a closed thermoplastics container and a valve device attached to said container at an aperture of said container for controlling fluid flow through said aperture, said valve device comprising a thermoplastics housing, a  
20 port in said housing for flow of said fluid, and a flow control member in said housing and arranged to control flow of said fluid through said port, said housing being formed in one piece and being attached directly to said container by fusion or adhesion.

According to a third aspect of the present invention, there is provided a combination comprising a closed bag and a valve device  
30 attached to said bag at an aperture of said bag and arranged to control not only fluid flow out of said bag but also fluid flow into said bag.

According to a fourth aspect of the present invention, there is provided a combination comprising a closed bag and a valve device attached to said bag at an aperture of said bag, arranged to control flow of fluid out of said bag and including a valve closure member  
40 which is manually openable in a direction opposite to the direction of flow of fluid out of said bag via said valve device.

According to a fifth aspect of the present invention, there is provided a combination comprising a closed bag, an aperture of said bag, an annular flange sealed to said bag round said aperture, and a valve device body sealingly attached to said flange round an inner periphery of said flange and not projecting  
50 substantially beyond said flange inwardly of said bag.

In order that the invention may be clearly understood and readily carried into effect, reference will now be made, by way of example, to the accompanying drawings, in which:

Figure 1 shows a vertical sectional view through a valve device of a bag-in-box, liquid-containing pack, and,

Figure 2 shows a view similar to Figure 1 of a modified version of the valve device.

Referring to Figure 1, the pack includes a thermoplastics bag 1 which contains a liquid. This liquid may be wine, for example, in which case it is highly desirable that the contact of  
65 oxygen gas with the wine should be as little

as possible, in order that the shelf-life of the pack should be as long as possible. The bag has an aperture 2 through which extends a one-piece, thermoplastics housing 3 of the valve device 4. The housing 3 provides a frusto-conical valve seat 5 which faces in an upstream direction with respect to wine flowing from the bag 1 through the valve device 4 and which encircles a port 6, the common  
70 axis of the seat 5 and the port 6 being horizontal. Guided in a horizontal bore 7 through a wall of the housing 3 is a stem 8 of a one-piece, thermoplastics movable valve member 9. The member 9 includes a valve closure element 10 which is in the form of a circular dish and is arranged to co-operate with the valve seat 5. The axially outer end of the stem 8 is engaged in a central, internal boss of an elastomeric, cup-shaped diaphragm 11,  
80 the outer peripheral rim of which is engaged in an annular groove 12 in the outside of the housing 3. The diaphragm 11 urges the element 10 against the seat 5. The housing 3 is formed with a vertical downwardly-directed mouth 13 which communicates with the port 6. The housing 3 includes a radial, outwardly-directed, annular flange 14, which is located just inside the bag 1 and which is adhered, by an annulus of fusion or adhesion, in the present example by an annulus of heat welding,  
90 to an annular part of the bag 1 encircling the aperture 2. The diaphragm 11 is encircled by an axial, outwardly-directed, annular flange 15 of the housing 3, this flange projecting beyond the diaphragm.

In order to fill the pack 1 with wine, for example, a wine supply pipe (not shown) is connected to the mouth 13, and the wine is pumped into the bag 1 through the port 6.  
105 The opening of the valve member 9 for this purpose is achieved by using the wine pumping pressure to open the member 9 against the biasing action of the diaphragm 11 and/or by using a piston (not shown) to press the diaphragm 11 to open the member 9. When the bag 1 has been filled with wine, the wine supply pipe is disconnected. The member 9 is of course held closed by the diaphragm 11 and by the pressure of the wine within the bag 1.

In spite of the contact seals between the valve closure element 10 and the valve seat 5, between the housing 3 and the diaphragm 11 at the groove 12, and between the housing 3 and the valve stem 8 at the bore 7,  
115 there is still a risk that the ambient air can penetrate through those contact seals to the wine in the bag. Therefore, in order to minimize this risk, the mouth 13 and the interior of the flange 15 are sealed off from the ambient air by a sealing strip 16 in the form of self-adhesive barrier tape or thermoplastics heat-sealed to the housing 3. At its upper end, the tape 16 is formed with a tab 17 for grasping by a user wishing to tear the strip  
130

16 from the valve device 4. The strip 16 has two further advantages, namely that it aids in providing a tamper-proof pack and that it lessens the risk of the diaphragm 11 being inadvertently pressed during carriage.

It will be noted that the main body of the device 4, that is to say all of the housing 3 apart from the flange 14, does not extend beyond the flange 14 inwardly of the bag 1. This has the advantage of avoiding any risk of air becoming trapped in an extension of the main body inwardly from the flange. Moreover, the closeness to the flange 14 of the element 10 and the seat 5 minimizes any risk of air becoming trapped between the element 10 and the wine.

Referring to Figure 2, the version shown therein again has a thermoplastics bag 1 formed with an aperture 2 through which extends a one-piece thermoplastics housing, referenced 103, of a valve device 104. The valve device again includes a thermoplastics movable valve member 109 consisting of a stem 8 and a cup-shaped valve closure element 110 which, at its rim, seats against a valve seat 105 at the lower end of a downwardly directed, vertical mouth 13 of the housing 103. The stem 8 is again connected to a diaphragm 11 of which the outer peripheral rim is received in a groove 12 in the outside of the housing 103. The diaphragm 11 is again encircled by a flange 115 of the housing 103. In this version, the mouth 13 and the interior of the flange 115 are sealingly closed against the ambient air by respective sealing strips 116 formed of self-adhesive barrier tape or of thermoplastics heat-sealed to the housing 103. Each strip 116 includes its own tab 117 whereby the strip can be torn from the housing. Yet again, a radial flange 14 of the housing 103 is annularly heat-welded to the bag 1.

This version can be filled in one of two alternative ways. Either the pack 1 incorporates a non-return valve (not shown) through which the wine is pumped into the bag and then the non-return valve is covered by a strip (not shown) corresponding to the strip 116, or the member 109 is held open by a piston applied to the diaphragm 11 and the wine pumped through the mouth 13 from a supply pipe into the bag 1.

#### CLAIMS

1. A valve device including a first sealing zone at which two parts of said valve device are in sealing contact with each other, and a second sealing zone which is arranged in series with said first sealing zone with respect to the flow of any fluid leaking through between said two parts and at which a fusion or adhesion seal is provided.

2. A valve device as claimed in claim 1, and further comprising a third sealing zone which is arranged in series with the first sealing zone

and in parallel with the second sealing zone with respect to the flow of any fluid leaking through between said two parts and at which a fusion or adhesion seal is provided.

3. A valve device as claimed in claim 1 or 2, wherein said second sealing zone is at an outlet of said valve device.

4. A valve device as claimed in claim 2, or claim 3 as appended to claim 2, wherein said third sealing zone is at a manually accessible member whereby the valve device is operable.

5. A valve device as claimed in claim 4, wherein said member is encircled by an annular flange projecting outwardly beyond said member and having its outwardly projecting end forming part of said third sealing zone.

6. A valve device as claimed in any preceding claim, wherein the, or each, fusion or adhesion seal comprises self-adhesive barrier tape or heat-sealed thermoplastics.

7. A combination comprising a closed thermoplastics container and a valve device attached to said container at an aperture of said container for controlling fluid flow through said aperture, said valve device comprising a thermoplastics housing, a port in said housing for flow of said fluid, and a flow control member in said housing and arranged to control flow of said fluid through said port, said housing being formed in one piece and being attached directly to said container by fusion or adhesion.

8. A combination as claimed in claim 7, wherein said container comprises a bag.

9. A combination comprising a closed bag and a valve device attached to said bag at an aperture of said bag and arranged to control not only fluid flow out of said bag but also fluid flow into said bag.

10. A combination as claimed in claim 9, wherein said valve device comprises a valve closure element which is manually openable in a direction opposite to the direction of flow of fluid out of said bag via said valve device, and biasing means urging said valve closure element in said direction of flow of fluid.

11. A combination as claimed in claim 10, wherein said biasing means comprises a manually depressable diaphragm.

12. A combination comprising a closed bag and a valve device attached to said bag at an aperture of said bag, arranged to control flow of fluid out of said bag and including a valve closure member which is manually openable in a direction opposite to the direction of flow of fluid out of said bag via said valve device.

13. A combination as claimed in claim 12, wherein said element is in, or close to, said aperture.

14. A combination as claimed in claim 13, wherein said valve device comprises an annular flange sealed to said bag round said aperture, and a valve device body sealingly attached to said flange round an inner periphery of said flange and not projecting substantially

beyond said flange inwardly of said bag.

15. A combination comprising a closed bag, an aperture of said bag, an annular flange sealed to said bag round said aperture, and a valve device body sealingly attached to said flange round an inner periphery of said flange and not projecting substantially beyond said flange inwardly of said bag.

16. A valve device, substantially as hereinbefore described with reference to Fig. 1 or 2 of the accompanying drawings.

#### CLAIMS

New claims or amendments to claims filed on date of search report

Superseded claims all

New or amended claims:

1. A combination comprising a closed thermoplastics container and a valve device attached to said container at an aperture of said container for controlling fluid flow through said aperture, said valve device comprising a thermoplastics housing, a port in said housing for flow of said fluid, and a flow control member in said housing and arranged to control flow of said fluid through said port, said housing being formed in one piece and being attached directly to said container by fusion or adhesion.
2. A combination as claimed in claim 1, wherein said container comprises a bag.
3. A combination as claimed in claim 1 or claim 2, in which said bag is arranged to control not only fluid flow out of said bag but also fluid flow into said bag.
4. A combination as claimed in claim 5, wherein said valve device comprises a valve closure element which is manually openable in a direction opposite to the direction of flow of fluid out of said bag via said valve device, and biasing means urging said valve closure element in said direction of flow of fluid.
5. A combination as claimed in claim 4, wherein said biasing means comprises a manually depressable diaphragm.
6. A combination comprising a closed bag and a valve device attached to said bag at an aperture of said bag, arranged to control flow of fluid out of said bag and including a valve closure member which is manually openable in a direction opposite to the direction of flow of fluid out of said bag via said valve device.
7. A combination as claimed in claim 6, wherein said element is in, or close to, said aperture.
8. A combination as claimed in claim 7, wherein said valve device comprises an annular flange sealed to said bag round said aperture, and a valve device body sealingly attached to said flange round an inner periphery of said flange and not projecting substantially beyond said flange inwardly of said bag.

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